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periods of time. Perihelion is in that part of the orbit where the planet is far south of the ecliptic. In the case of *Aethra* both these conditions combine to cause the planet to be always far south of the equator when near perihelion. The great eccentricity of the orbit makes this a very serious matter for observers in the northern hemisphere. For such oppositions as last year, when the planet is far north, the nearness to aphelion causes it to be faint. When it is bright it is many degrees below the equator. This explains one of the facts that has puzzled those who have studied the orbit. How could a planet which becomes as bright as *Aethra* does at times miss accidental observation during a period of forty years? By explaining this circumstance it seems to the writer that the probability of identity is much increased.

An ephemeris has been computed for the coming opposition. On December 1st the declination will be -24° and the magnitude 10.6, which is brighter than it was at any time last year. February 1st it will be 41° south and will have a magnitude of 10.3. During March and the early part of April it will be about 45° south and have a magnitude of about 10.0. It then begins its return north, coming to opposition about May 1st, 42° south of the equator with a magnitude of 9.9. These magnitudes are based on the 1873 visual observations and, according to the Lowell observation, should be somewhat brighter.

It is worth while to note that the coming opposition is similar to those in 1873, when it was discovered, and in 1913 when it is assumed to have been reobserved. It will be very easy, especially for southern observatories, to make a search that will settle the question of identity. Northern observatories can best search for it in December, five months before it comes to opposition.

DINSMORE ALTER.

Students' Observatory,
University of California.
1916, July 20

DELICATE EARTH TREMORS.

On the night of August 18, 1916, a continuous series of tremors was noted, while attempting to observe over the nadir for level of the meridian circle. The tremors lasted

for at least five minutes, between 8^h 52^m and 8^h 57^m P. S. T., beyond which interval other duties required the observer's attention. Fifteen minutes later the mercury was quiet and the vibration had evidently ceased. The period of the tremors was short, less than one second; and the amplitude was estimated at about two seconds of arc. Both amplitude and period were shorter than tremors of a similar character that had been previously noted in this manner, and which were associated with earthquake shocks, either of moderate intensity in the neighborhood of the observatory, or of severe intensity at greater distances.*

No vibrations are recorded on the sheet of the large Wiechert Seismograph of the observatory, and it appears to be probable that the indication given by the basin of mercury is more delicate than that of any instrument depending upon the disturbance of the equilibrium of a balanced weight.

Since a second of arc corresponds to about the two-thousandth part of an inch, over the mercury basin, the amplitude of the vibrations was of the order of the thousandth part of an inch. But, as the tremors noted are most likely to be in the form of waves passing over the surface, the amplitude does not correspond exactly to the amount of disturbance in the strata below.

Such tremors in the mercury are entirely different from those produced by a shock in the rock supporting the instrument, or from those produced by wind. They are undoubtedly an indication of vibration in the rock strata, and are believed to be connected with some earthquake, perhaps too slight to be detected by other means.

August 21, 1916.

R. H. TUCKER.

ADDENDUM TO NOTE ON THE INTERNAL VELOCITIES OF NEBULÆ.

In the last number of these PUBLICATIONS, pages 119-120, in a note concerning observations of relative velocity within each of six planetary nebulæ, we referred briefly to the remarkable form of the bright lines in the spectrum of the

**Science*, 1900, Vol. XI, p. 217.

**Pub. Astr. Soc. Pac.* 1894, Vol. VI, p. 184.